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Test 804: Ursus C-325 (Diesel)

Tractor Museum
University of Nebraska-Lincoln, TractorMuseumArchives@unl.edu

NEBRASKA TRACTOR TEST 804 - URSUS C-325 DIESEL

The University of Nebraska Agricultural Experiment Station

E. F. Frolik, Dean; A. W. Epp, Acting Director, Lincoln, Nebraska

POWER TAKE-OFF PERFORMANCE

Hp	Crank shaft speed rpm	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temp. Degrees F Cool-ing med	Temp. Degrees F Air wet bulb	Temp. Degrees F Air dry bulb	Barometer inches of mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
24.60	2000	1.664	0.466	14.78	183	70	75	28.923
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
21.76	2082	1.423	0.451	15.29	176	69	75	.....
0.00	2253	0.496	....	....	148	69	75	.....
11.47	2193	0.931	0.560	12.32	158	69	75	.....
25.65	2000	1.684	0.453	15.23	184	69	75	.....
5.86	2237	0.705	0.829	8.31	155	69	75	.....
16.87	2149	1.170	0.478	14.42	169	69	75	.....
Av **13.60**	**2152**	**1.068**	**0.542**	**12.73**	**165**	**69**	**75**	**28.910**

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	Slip of driv-ers %	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Temperature Degrees F Air wet bulb	Temperature Degrees F Air dry bulb	Barometer inches of mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—4th Gear											
21.66	2236	3.63	2000	8.42	1.608	0.512	13.47	180	67	77	29.093
75% of Pull at Maximum Power—Ten Hours—4th Gear											
18.06	1743	3.89	2093	6.45	1.336	0.510	13.52	173	68	82	29.053
50% of Pull at Maximum Power—Two Hours—4th Gear											
12.60	1154	4.09	2170	4.98	1.060	0.580	11.89	163	70	82	29.103
MAXIMUM POWER WITH BALLAST											
15.31	3348	1.71	2133	14.92	2nd Gear.....			162	64	68	29.065
21.09	2977	2.66	2002	12.52	3rd Gear.....			171	68	73	29.055
22.30	2313	3.61	2006	9.12	4th Gear.....			171	68	73	29.055
22.20	1138	7.32	2004	4.93	5th Gear.....			170	68	72	29.085
20.73	656	11.85	2000	3.45	6th Gear.....			165	68	72	29.085
MAXIMUM POWER WITHOUT BALLAST											
21.34	2245	3.56	2001	9.39	4th Gear.....			185	70	84	29.060

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—4th Gear						
Pounds pull	2300	2400	2400	2300	2200	2150
Horsepower	22.3	20.5	18.6	15.3	12.9	10.3
Miles per hour	3.6	3.2	2.9	2.5	2.2	1.8

TIRES, BALLAST and WEIGHT		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 10-28; 6; 14	Two 10-28; 6; 12
Ballast	—Liquid	244 lb each	None
	—Cast iron	278 lb each	None
Front tires	—No, size, ply & psi	Two 6.00-16; 4; 28	Two 6.00-16; 4; 28
Ballast	—Liquid	None	None
	—Cast iron	92 lb each	None
Height of drawbar		21½ inches	21½ inches
Static weight	—Rear	3274 lb	2230 lb
	—Front	1400 lb	1242 lb
Total weight with operator		4849 lb	3647 lb

Department of Agricultural Engineering
Dates of Test: June 29 to July 10, 1961
Manufacturer: ZAKLADY MECHANICZNE "URSUS," URSUS/WARSAW, POLAND
Manufacturer's Power Rating: 25 Engine Horsepower, 24 PTO Horsepower and 19 Drawbar Horsepower.

FUEL, OIL and TIME Fuel No. 2 Diesel **Cetane No** 54 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.8283 **Weight per gallon** 6.896 lb **Oil** SAE 30 **API service classification** DS **To motor** 1.836 gal **Drained from motor** 1.266 gal **Transmission and final-drive lubricant** SAE 90 **Total time engine was operated** 44½ hours.

ENGINE Make Ursus Diesel **Type** 2 cylinder vertical **Serial No** 05913 **Crankshaft mounted** lengthwise **Rated rpm** 2000 **Bore and stroke** 3.859" x 4.724" **Compression ratio** 16.5 to 1 **Displacement** 110.8 cu in **Cranking system** 12 volt electric (two 6 volt batteries) **Lubrication** pressure **Air cleaner** oil washed wire screen **Oil filter** centrifugal **Fuel filter** one replaceable felt element **Muffler** was used **Cooling medium temperature control** thermostat.

CHASSIS Type standard **Serial No** 04221 **Tread width** rear 49.25" to 72.89" from 49.25" to 59.10" **Wheel base** 72½" **Center of gravity** (without operator or ballast with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 24.5" Vertical distance above roadway 26.5" Horizontal distance from center of rear wheel tread 0.12" to the left **Hydraulic control system** direct engine drive which can be disconnected **Transmission** selective gear fixed ratio **Advertised speeds mph** first 1.01 second 1.94 third 3.10 fourth 4.06 fifth 7.82 sixth 12.54 reverse 0.845 and 3.42 **Clutch** single plate dry disc operated by foot pedal **Brakes** expanding double shoe operated by two independent foot pedals **Steering** no power assistance **Turning radius** (on concrete surface with brake applied) right 106" left 106" (on concrete surface without brake) right 126" left 126" **Turning space diameter** (on concrete surface with brake applied) right 220" left 220" (on concrete surface without brake) right 260" left 260" **Belt pulley** 1373 rpm at 2000 engine rpm diam 8.67" face 5.71" **Belt speed** 3100 fpm **Power take-off** 549 rpm at 2000 engine rpm.

REPAIRS and ADJUSTMENTS During drawbar runs a valve stem pulled out of inner tube in rear tire. New inner tubes were installed in both rear tires and test continued.

REMARKS All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

First gear was not run as it was necessary to limit the pull in second gear to avoid excessive wheel slippage.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 804.

L. F. LARSEN
Engineer-in-Charge

L. W. HURLBUT, Chairman
G. W. STEINBRUEGGE
J. J. SULEK
Board of Tractor
Test Engineers

EXPLANATION OF TEST REPORT

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ the 85% torque; maximum power, ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine governor, automatic transmissions, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the **Nebraska Tractor Tests** write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.**

Ursus C-325 Diesel